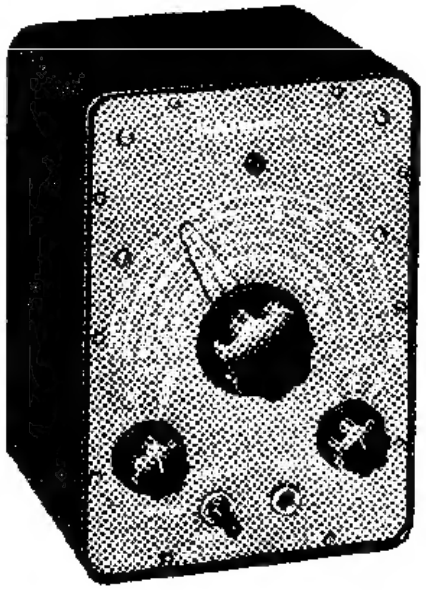
knight-kits



Allied knight® - kit VFO

83Y725

ALLIED RADIO
CORPORATION
100 N WESTERN AVE. • CHICAGO 80, ILL.
TELEPHONE
HAYMARKET 1-6800

83K150
7500804-15-CA-556

within the limits of the various amateur bands.

HOW TO TEST AND OPERATE YOUR KNIGHT VFO

The rotary switch, S-1, marked "BANDS" is a two position switch. The 80 and the 11 meter band are covered by one position of the switch which places section "A" of the tuning capacitor and C-1, the air padder capacitor, in the frequency determining circuit. The 40, 20, 15, and 10 meter bands are covered by the other position of the Band Switch, which puts C-3B and C-2 in the frequency determining circuit.

The rotary switch, S-2A, B, marked "OUTPUT", is a three position switch. The AC power is removed when the switch is in the first position, the 80 meter band is covered by the second position which puts L-3 into the output circuit. The third position of the switch puts L-4 into the output circuit for the 40, 20, 15, 10, and 11 meter bands.

The lever switch, S-3, is marked "CALIBRATE – STANDBY – TRANSMIT". This switch has an extra set of terminals so that auxiliary equipment may be controlled from the VFO position. The Standby position of this switch enables you to leave the VFO continuously in operating condition without waiting for it to warm up for each transmission.

Your key plugs directly into the KEY jack on the front panel of the KNIGHT VFO.

To check the operation of the KNIGHT VFO, plug the line cord into the power source. Put the lever switch in the Standby position. Turn the Band Switch to either position. Turn the Output Switch to the position corresponding to the Band Switch. The pilot light should light. The tubes should also light, and the 0A2 should have a violet glow.

If the pilot light and the tubes light, you are ready to install the KNIGHT VFO in the cabinet.

Remove the line cord plug from the power source. Push the line cord plug and the output cable plug through the large hole in the back of the cabinet.

Slide the VFO into the cabinet. Use the ten small sheet metal screws supplied in the holes in the front panel and tighten them into the holes in the cabinet. Tighten the two larger sheet metal screws into the holes in the back of the oscillator chassis.

You are now ready to calibrate your KNIGHT VFO.

HOW TO CALIBRATE YOUR KNIGHT VFO

Do not use your KNIGHT VFO with your transmitter until you have

calibrated it, because it may be operating outside of the bands.

Before you begin calibration of the KNIGHT VFO turn the slug on L-3, which is the coil nearest the edge of the back of the cabinet, almost all of the way into the coil form. Turn the slug on L-4 almost all of the way out of the coil form. This approximate adjustment will assure more than enough output for calibration purposes.

If you have a 1750 KC crystal, install it in your transmitter. If not, use any crystal whose frequency is within the 80 meter band, preferably near the low end of the band.

Place the oscillator of your transmitter in operation, but do not apply plate voltage to the final amplifier. Turn on your receiver and the VFO. Put S-3 on the VFO in the Calibrate position. Allow about one-half hour for all of the equipment to warm up.

In the meantime, clip a piece of wire about 10 inches long to the inner conductor prong of J-2. Lay this piece of wire close to the antenna connection of your receiver.

Set the VFO Band Switch to the position marked "80 11". Set the Output Switch to the position marked "80". Set the dial pointer of the VFO to 3.5 megacycles if you are using a 1750 KC crystal. If not, set the dial of the VFO according to the frequency of the crystal. Tune the receiver to pick up the signal from the transmitter. Close the plates of C-1, which is the air padder nearer the top of the cabinet, by turning the screw.

When the equipment is warmed up, adjust C-1 until the VFO zero beats with the crystal as heard in the receiver.

This adjustment completes the calibration of the 80 and 11 meter bands since the 11 meter band is a harmonic of the 80.

To calibrate the other bands, turn the Band Switch to the position marked "40, 20, 15, and 10", and the Output Switch to the position marked "40, 20, 15, 10, and 11". If you have a 3500 KC crystal, use it in your transmitter, or you can use the 1750 KC crystal, to calibrate the other bands. Set the dial of the VFO to 7.0 megacycles, if you are using either a 3500 or 1750 KC crystal. If not, use any crystal whose frequency falls within either the 40, 20, 15, or 10 meter band, and set the dial of the VFO accordingly. Tune the receiver to pick up the signal from the transmitter. Adjust C-2 to zero beat with the crystal as heard in your receiver.

After you have calibrated the VFO and it is operating within the limits of each band, set the dial of the VFO to the middle of the 80 meter band. Tune the circuits of your transmitter for resonance and then adjust the slug-tuned coil L-3, the coil nearest the side of the cabinet, for maximum reading on the first metered circuit of your transmitter.

Set the Band Switch and the Output Switch to the other band position. Set the dial of the VFO to 14 megacycles. Tune the circuits of your transmitter for resonance and then adjust the slug-tuned coil L-4 for maximum reading on the first metered circuit of the transmitter. By making this adjustment at 14 megacycles all of the other bands will also be operating with good output.

SERVICE HINTS

If you have followed all of the previous instructions carefully your KNIGHT VFO should operate properly. If it does not, here are some helpful hints:

If there is no power supplied to the other tubes, and the 6X4 rectifier tube lights, check L-5 and R-7. Also check the other tubes.

If there is operation with the Band Switch and Output Switch in the 40 meter band position, check the circuit components controlled by the 80 meter position of these two switches. Repeat this procedure for the other band components.

If your KNIGHT VFO still does not operate properly, have one of your friends, preferably another Ham, check your wiring.

ALLIED'S SERVICE FACILITIES

In the event that the kit still does not operate properly, we recommend the following:

Please write our Kit Department with full details, and include the stock number and the date of purchase of the kit. We may be able to determine any wiring error or replace a component which may be at fault.

This wired KNIGHT kit may be returned for inspection within 1 year after purchase. The kit will be placed in proper operating condition for $5.00. Faulty parts will be replaced without charge unless damage was caused in construction or because of a wiring error.

PLEASE NOTE: KITS WIRED WITH ACID CORE SOLDER OR ACID FLUX ARE NOT ELIGIBLE FOR REPAIR OR SERVICE AND WOULD HAVE TO BE RETURNED NOT REPAIRED AT YOUR EXPENSE.

Allied's facilities primarily provide an inspection and trouble-shooting service. Kits not completed, which require extensive work, will be returned collect with a letter of explanation.

If you must return this kit, pack it well. Use the original packing carton and the cushioning material around the front panel. Send the kit prepaid and insured. We will return the repaired kit to you C.O.D. as soon as repairs are completed. If you wish to save C.O.D. fees, your advance remittance may be enclosed for standard repair charges plus transportation costs. Any excess remittance will be refunded.

ALLIED'S GUARANTEE ON KNIGHT KITS

The designs and components selected for KNIGHT kits represent over a quarter of a century of experience in kit development. KNIGHT kits are easy to assemble even for the beginner. Instructions are complete, panels are drilled, the chassis is punched and formed, and every last part is included as listed.

Allied extends these firm guarantees on KNIGHT Kits:

We guarantee that the circuits on all KNIGHT kits have been carefully engineered and tested.

We guarantee that only high-quality components are supplied. All parts are covered by the standard RETMA 90-day warranty. Any faulty components will be replaced prepaid and without charge if reported to us within the warranty period. We reserve the right to request the return of defective parts.

If your kit was shipped by parcel post and is received in a damaged condition, please write us at once describing the state in which the shipment was received. If your kit was part of a Railway Express shipment that was damaged in transit, please notify the Railway Express agent at once and then write us.

Allied Radio cannot accept responsibility or liability for injury or damage sustained in the assembly or operation of the kit.

The efficiently engineered KNIGHT kits are moderately priced. When you buy a KNIGHT kit you get best design, best quality, and best value. Recommend KNIGHT kits to your friends.

HOW THE KNIGHT VFO WORKS

Stability is of utmost importance in the design of any frequency determining equipment. There are three principal things which can change the frequency setting of a VFO – mechanical movement between parts, temperature changes of critical parts, or a change in the electrical value of a part. The KNIGHT VFO greatly exceeds the minimum stability requirements of the Federal Communications Commission for amateur radio transmitters.

Mechanical stability has been achieved in the KNIGHT VFO by the following: The oscillator tank coil is wound on a heavy ceramic form, the padders are of the air dielectric type, there are two separate and distinct chassis – one for the power supply and one for the oscillator, the oscillator chassis is flange welded for rigidity, the band switch is the ceramic wafer type.

Temperature stability results from the following: The power supply chassis is above the oscillator chassis so that all heat generated does not affect the frequency determining components, each chassis and the cabinet are well ventilated, all frequency determining components are under the oscillator chassis which isolates them from convection currents.

Electrical stability is largely achieved by the use of large series capacities so that the capacity of the tubes is negligible whenever a tube change is necessary.

The KNIGHT VFO uses the famous series-tuned Clapp oscillator circuit. The voltage divider in this circuit consists of C-4 and C-5, the 780 MMFD 1% silver mica capacitors, which furnish an in-phase voltage between the grid and the cathode of V-1 to maintain oscillation. The basic output frequencies are developed through the use of L-1 and C-3A, B. Two padder capacitors, C-1 and C-2, are in parallel with the tuning capacitor to calibrate the VFO.

The KNIGHT VFO is keyed in the cathode of V-1, the oscillator tube. The three-position lever switch permits changing from Calibrate to Standby to Transmit. When this switch is in Transmit position the key is placed in the circuit. This lever switch is connected to the terminal strip on the back of the chassis for control of external equipment, such as a relay to switch the antenna from your transmitter to your receiver, or to control the voltage to the tubes in the following stages.

The output of the oscillator is capacity coupled to the 6AK6 buffer amplifier. The output of the buffer amplifier is peaked in the center of the respective bands by the two slug-tuned coils that are resonated by the capacity of the output cable and stage.

The KNIGHT VFO has a transformer type power supply. The output of the 6X4 rectifier tube feeds into a choke input filter consisting of L-5 and C-13. The output of the filter section feeds the buffer amplifier, while the OA2 voltage regulator supplies 150 volts regulated to the oscillator. The power switch is located on the Output Switch.

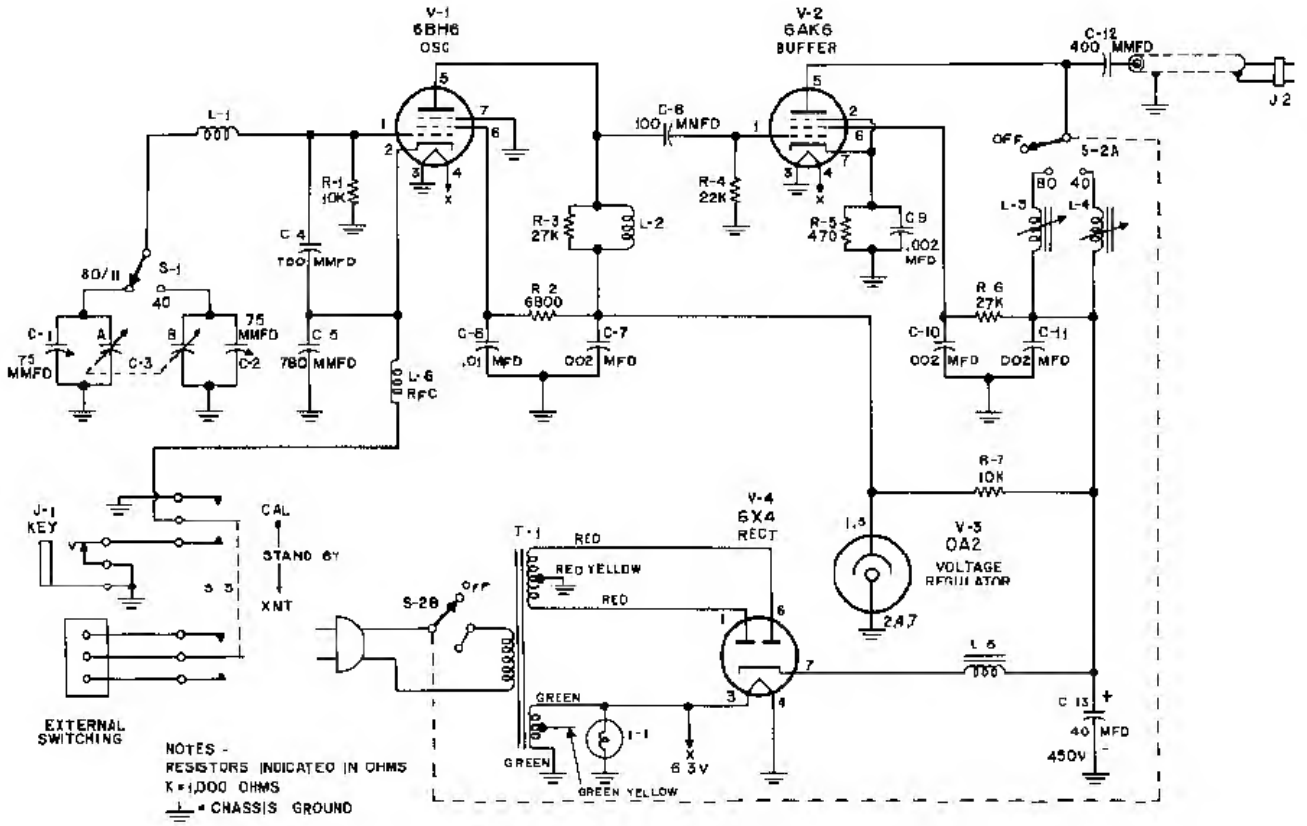


FIGURE 19. SCHEMATIC DIAGRAM, KNIGHT VFO

VOLTAGE CHART

All measurements made with a vacuum tube voltmeter.
Both switches in the 80 meter band position.

	PIN NUMBER						
TUBE	1	2	3	4	5	6	7
V-1 6BH6	-6	0.25	0	6.3AC	150	140	0
V-2 6AK6	-32	4.75	0	6.3AC	250	175	4.5
V-3 OA2	150	0	NC	0	150	NC	0
V-4 6X4	300AC	NC	0	6.3AC	NC	300AC	250AC

NC No Connection.

RESISTANCE CHART

K = 1,000 ohms, M = 1,000,000 ohms.
All readings taken between specified point and ground.

	PIN NUMBER						
TUBE	1	2	3	4	5	6	7
V-1 6BH6	10K	40	0	0	Infinite	Infinite	0
V-2 6AK6	22K	470	0	0	Infinite	Infinite	470
V-3 OA2	Infinite	0	NC	0	Infinite	NC	0
V-4 6X4	270	NC	0	0	NC	270	Infinite

PARTS LIST

Symbol Number	Description	Part Number
	Capacitors	
C-1	Air padder, 75 µµfd	[illegible]
C-2	Air padder, 75 µµfd	[illegible]
C-3A, B	Tuning, [illegible]	[illegible]
C-4	Silver mica, 780 µµfd, [illegible]	[illegible]
C-5	Silver mica, 780 µµfd, [illegible]	[illegible]
C-6	Disc, .01 µfd	[illegible]
C-7	Disc, .005 µfd	[illegible]
C-8	Mica, 100 µµfd	[illegible]
C-9	Disc, .002 µfd	[illegible]
C-10	Disc, .002 µfd	[illegible]
C-11	Disc, .002 µfd	[illegible]
C-12	Mica, 400 µµfd	[illegible]
C-13	Electrolytic, 40 µfd, 450 V	[illegible]
	Resistors	
	Note: When ordering resistors give complete description and part number	
R-1	10K ohm, 1/2 watt	[illegible]
R-2	100K ohm, 1/2 watt	[illegible]
R-3	27K ohm, 1/2 watt	[illegible]
R-4	22K ohm, 1/2 watt	[illegible]
R-5	[illegible] ohm, 1/2 watt	[illegible]
R-6	27K ohm, 1/2 watt	[illegible]
R-7	Wirewound, 10K ohm, 7 watt	[illegible]
	Inductors & Transformers	
L-1	Coil, oscillator tank	[illegible]
L-2	Coil, oscillator impedance, 150 µh (wound on [illegible])	[illegible]
L-3	Coil, slug-tuned, output peaking	[illegible]
L-4	Coil, slug-tuned, output peaking	[illegible]
L-5	Choke, 5.5 Henry	[illegible]
L-6	Choke, RF, 2.5 mh	[illegible]
T-1	Power transformer	[illegible]
	Switches	
S-1	BAND, ceramic rotary, [illegible]	[illegible]
S-2	POWER & OUTPUT, rotary	[illegible]
S-3	CALIBRATE, STANDBY & TRANSMIT, lever, DPDT	[illegible]

Symbol Number	Description	Part Number
	Jacks, Plugs & Terminal Strips	
J-1	Key jack, shorting type	[illegible]
P-1	[illegible] plug	[illegible]
TS-1	[illegible]-terminal strip	[illegible]
TS-2	Eight-terminal strip	[illegible]
TS-3	[illegible]-terminal strip	[illegible]
TS-4	[illegible]-terminal strip	[illegible]
TS-5	[illegible] terminal strip	[illegible]
	Tubes	
V-1	6BH6	[illegible]
V-2	6AK6	[illegible]
V-3	OA2	[illegible]
V-4	6X4	[illegible]

Description	Quantity	Part Number
Miscellaneous		
[illegible]	1	[illegible]
Chassis, oscillator	1	[illegible]
Chassis, power supply	1	[illegible]
Cord, line	1	[illegible]
Grommets, rubber, 1/2"	3	[illegible]
Grommets, rubber, 3/8"	1	[illegible]
Knob, 1-1/4"	2	[illegible]
Knob, 2"	1	[illegible]
Panel	1	[illegible]
Pointer, dial	1	[illegible]
Socket, 7-pin miniature, light colored	1	[illegible]
Socket, 7-pin miniature, dark colored	3	[illegible]
Manual, instruction	1	[illegible]
Pilot light assembly	1	[illegible]
Jewel	1	[illegible]
Nut	1	[illegible]
Socket	1	[illegible]
Bulb	1	[illegible]

Description	Quantity	Part Number
Hardware		
Ground lugs	4	[illegible]
Lockwashers, #6	8	[illegible]
Lockwashers, 3/8"	2	[illegible]
Nuts, [illegible]	8	[illegible]
Nuts, [illegible]	19	[illegible]
Nuts, [illegible]	4	[illegible]
Screws, machine, [illegible]	4	[illegible]
Screws, machine, [illegible]	4	[illegible]
Screws, machine, [illegible]	21	[illegible]
Screws, self-tapping, [illegible]	2	[illegible]
Screws, self-tapping, [illegible]	18	[illegible]
Spade bolts, [illegible]	2	[illegible]
Wire, Solder & Spaghetti		
3" red	[illegible]	[illegible]
3" orange	[illegible]	[illegible]
4" yellow	[illegible]	[illegible]
5" green	2	[illegible]
6" grey	2	[illegible]
5" white	2	[illegible]
10" brown	[illegible]	[illegible]
12" white-red	1	[illegible]
12" white-orange	1	[illegible]
14" white-yellow	2	[illegible]
13" white-green	1	[illegible]
#20 bare	[illegible]	[illegible]
Cable, shielded	[illegible]	[illegible]
Spaghetti	[illegible]	[illegible]
Solder, [illegible]	[illegible]	[illegible]

Tools Needed for Construction

Stock No.	Description	Price*
[illegible]	Soldering iron	[illegible]
[illegible]	6" long-nose pliers	[illegible]
[illegible]	4" diagonal cutters	[illegible]
[illegible]	4" screwdriver	.72

*Subject to change